Original Article

The Influence of Diabetes and Gestational Diabetes on the Pregnant Women of Rangpur Combined Military Hospital

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Abstract

Introduction: Gestational Diabetes Mellitus (GDM) and pre-existing Diabetes Mellitus (DM) are major issues in pregnancy, affecting both maternal and fetal health. This study aimed to explore the outcomes of pregnancies complicated by GDM and DM, focusing on delivery methods, fetal outcomes, and complications. **Methods:** This prospective observational study was conducted at the Combined Military Hospital in Rangpur, Bangladesh, from July 2022 to June 2023. It included 84 pregnant women, with 76.19% diagnosed with GDM and 23.81% with pre-existing DM. Participants were assessed for delivery method, fetal outcomes (including Apgar scores and birth weight), and maternal complications. Data were analyzed using statistical methods to compare outcomes between the GDM and DM groups. **Result:** The majority of participants (55.95%) underwent Cesarean Section, while 7.14% underwent normal delivery and 36.90% had continued pregnancy. In terms of fetal outcomes, 94.34% of newborns had an APGAR score >7 at 5 minutes, and 86.79% had a normal birth weight. There were no significant differences in Apgar scores or birth weight between the GDM and DM groups. **Conclusion:** The study demonstrates that pregnancies complicated by GDM and DM can have favorable outcomes with effective management. The high rate of Cesarean Sections and the low incidence of fetal complications highlight the importance of vigilant obstetric care. These findings underscore the need for targeted screening and individualized management strategies in diabetic pregnancies.

Keywords: Gestational diabetes mellitus, Diabetes mellitus, Pregnancy outcomes, Cesarean section, Fetal outcomes, Maternal complications

Introduction:

Gestational Diabetes Mellitus (GDM) stands as a pivotal concern in contemporary obstetric care, marked by its escalating prevalence across diverse global populations.[1,2] This condition, distinct from other forms of diabetes, emerges exclusively during pregnancy and is characterized by glucose intolerance. The differentiation from traditional diabetes mellitus lies in its temporal onset and specific implications for both maternal and fetal health.[3] The pathophysiology of GDM is primarily rooted in the hormonal changes of pregnancy, which lead to insulin resistance and subsequent hyperglycemia. Key risk factors include, but are not limited to, obesity, a history of GDM, advanced maternal age, and certain ethnic predispositions.[4,5] Tracing the historical trajectory of GDM reveals a landscape of evolving understanding. Initially, the focus was on immediate gestational risks, but over time, the lens widened to encompass long-term health implications for both mother and child. Seminal milestones in GDM research include the

establishment of diagnostic criteria and the recognition of its role as a precursor to future metabolic disorders, notably type 2 diabetes.[6] The significance of studying GDM cannot be overstated, given its profound impact on maternal and fetal outcomes. Women with GDM face heightened risks of preeclampsia, cesarean deliveries, and the future onset of type 2 diabetes. For the fetus, GDM increases the likelihood of macrosomia, birth injuries, and metabolic complications such as neonatal hypoglycemia. These immediate concerns are further compounded by long-term risks, including the child's increased susceptibility to obesity and metabolic syndromes and the mother's elevated risk of cardiovascular diseases.[7] Despite advancements, current research on GDM is riddled with gaps, particularly in the realms of optimal screening, diagnosis, and long-term follow-up. The debate continues over the best approaches to screening and diagnosis, and the long-term health trajectory of women with GDM remains incompletely understood.[8] These unresolved issues underscore the necessity for further research to refine diagnostic strategies, enhance management protocols, and fully elucidate the spectrum of GDM's impact. This study aims to bridge these gaps by delving into the long-term metabolic outcomes in children born to mothers with GDM and evaluating the efficacy of various management strategies during pregnancy. The research is poised to offer critical insights into targeted interventions and inform public health policies, thereby mitigating the risks associated with GDM.

Methods:

This prospective observational study, conducted from July 2022 to June 2023 at the Maternity ward of the Combined Military Hospital in Rangpur, Bangladesh, included 84 participants with gestational diabetes mellitus (GDM) and pre-existing diabetes mellitus (DM). The study aimed to comprehensively review diabetes in pregnancy, with broad inclusion criteria covering all pregnant women admitted during the study period. Exclusion criteria focused on maintaining research integrity, excluding induced abortions and other chronic illnesses. Data collection involved a detailed review of medical records and observations, emphasizing key variables like demographic information, diabetes history, pregnancy term, and complications. The study prioritized ethical considerations, obtaining approval from the hospital's ethics committee, informed consent from participants, and ensuring strict confidentiality.

Results:

Table-I: Distribution of participants by baseline characteristics (n=84)

Baseline characteristics	Frequency	Percentage
Age		
≤20	1	1.19%
21-30	59	70.24%
31-40	24	28.57%
Mean±SD	28.13±4.16	
Range	19-39	
Parity		
Nulliparity	14	16.67%
Primipara	36	42.86%
Multipara (2-3)	29	34.52%
Multipara (4-5)	5	5.95%
Gestational Week		
≤21 weeks	4	4.76%
22-28 weeks	1	1.19%
29-35 weeks	26	30.95%
36-38 weeks	39	46.43%
39 weeks and above	14	16.67%

In this study of 84 participants, the age distribution predominantly fell in the 21-30 years range, accounting for 70.24%, followed by 28.57% in the 31-40 years bracket. The Mean±SD age was 28.13±4.16 years, and the participants age ranged from of 19-39 years. Parity-wise, primipara (first-time mothers) constituted the largest group at 42.86%, followed by multipara with 2-3 births at 34.52%. Nulliparous women (those who have never given birth) made up 16.67%, and a smaller group of 5.95% was multipara with 4-5 births. Regarding gestational weeks, the majority were in the later stages of pregnancy, with 46.43% in the 36-38 weeks range and 30.95% in the 29-35 weeks

range. Participants at 39 weeks and above represented 16.67%, while early stages (≤21 weeks and 22-28 weeks) were less common, at 4.76% and 1.19% respectively.

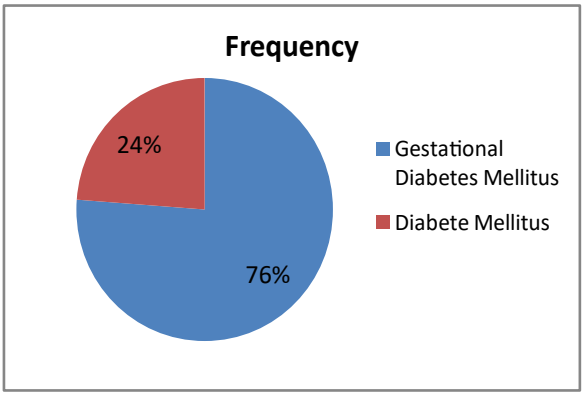

Figure-1: Distribution of participants by type of diabetes (n=84)

The distribution by type of diabetes was predominantly Gestational Diabetes Mellitus (GDM), which accounted for 76.19%. The remaining 23.81% had pre-existing Diabetes Mellitus (DM).

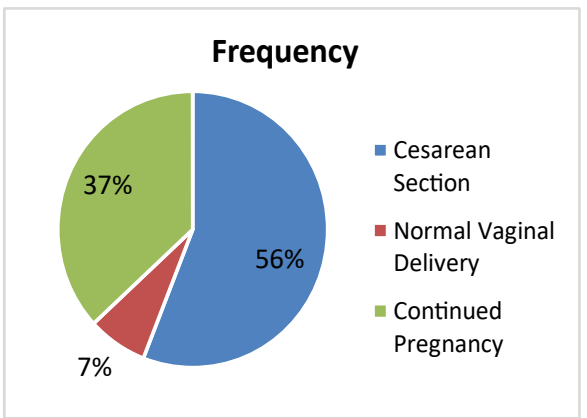

Figure-2: Distribution of participants by method of delivery (n=84)

Regarding the method of delivery among these participants, a significant majority underwent Cesarean Section, representing 55.95% of the cases. Normal Vaginal Delivery was less common, with only 7.14% delivering through this method. The remaining 36.90% had continued pregnancy by the end of the study.

Table-II: Distribution of participants by indication for cesarean section (n=47)

Indicator for CS	Frequency	Percentage
Previous one Cesarean section	11	23.40%
Repeat Cesarean section	3	6.38%
Pre-Eclampsia & PIH	11	23.40%
Intra partum fetal distress	8	17.02%
Breech presentation	3	6.38%
Large size baby (weight more than 3.5kg), head high up	4	8.51%
Ante partum fetal distress (LFM, Oligohydramnios)	4	8.51%
Bad obstetric history/repeated Pregnancy loss	1	2.13%
Ante partum hemorrhage	1	2.13%
Obstructed labor	1	2.13%

In the subset of 47 participants who underwent Cesarean Section (CS), the distribution by primary indication for the procedure was varied. The most common indications were previous one cesarean section, with 11 participants or 23.40% of the total, and pre-eclampsia & PIH (pregnancy-induced hypertension), also with 11 participants or 23.40% of the total. The third most common indication was intrapartum fetal distress, with 8 participants or 17.02% of the total. Breech presentation and large baby size (over 3.5kg) with the head high up each accounted for 3 participants or 6.38% of the total. Antepartum fetal distress (low fetal movement, oligohydramnios) and bad obstetric history/ repeated pregnancy loss each accounted for 4 participants or 8.51% of the total. The less common indications were antepartum hemorrhage with 1 participant or 2.13% of the total and obstructed labor also with 1 participant or 2.13% of the total. Repeat cesarean section accounted for the remaining 3 participants or 6.38% of the total.

Table-III: Distribution of participants by pregnancy outcome (n=84)

Pregnancy Outcome	Frequency	Percentage
Live Childbirth during study period	53	63.10%
Continued pregnancy	31	36.90%
Stillbirth	0	0.00%

The outcomes of pregnancy were predominantly positive, with 63.10% resulting in live childbirth

during the study period. A significant portion, 36.90%, were still continuing their pregnancy at the conclusion of the study. Notably, there were no instances of stillbirth reported, as indicated by a 0.00% occurrence in the study cohort.

Table-IV: Distribution of fetal outcome among the childbirths (n=53)

Variable	Frequency	Percentage
Apgar score at 5 minutes		
≤7	2	3.77%
>7	50	94.34%
Birth weight		
Low birth weight	4	7.55%
Normal birth weight	46	86.79%
High birth weight	3	5.66%

In the subgroup of 53 participants who experienced childbirth during the study, fetal outcomes were predominantly positive. A significant majority of the newborns, 94.34% (50 infants), had an APGAR score of >7 at 5 minutes, indicating a healthy condition shortly after birth. Only a small fraction, 3.77% (2 infants), had an Apgar score of 7 or less. In terms of birthweight, the majority of infants, 86.79% (46), were within the normal birth weight range. Low birth weight was observed in 7.55% (4 infants), while a slightly higher birth weight was noted in 5.66% (3 infants) of the cases.

Table-V: Comparison of fetal outcome by type of diabetes (n=53)

Fetal Outcome Variables	GDM (n=43)		DM (n=10)		p-value
	n	%	n	%	
Apgar score at 5 minute					
≤7	2	4.65	0	0.00	0.84
>7	41	95.35	10	100.00	
Birth weight					
Low birth weight	3	6.98	1	10.00	
Normal birth weight	38	88.37	8	80.00	0.751
High birth weight	2	4.65	1	10.00	

The analysis of fetal outcomes in 53 childbirths revealed that infants born to mothers with gestational diabetes mellitus (GDM) had 4.65% with an Apgar score of ≤7 at 5 minutes, while those in the pre-existing diabetes mellitus (DM) group all had Apgar scores >7. Statistical comparison showed no significant difference (p-value= 0.84) in Apgar scores between the two groups. In terms of birthweight, 6.98% of infants in the GDM group had low birth weight, compared to 10.00% in the DM group. The majority in both groups had normal birth weight, with a p-value of 0.751 indicating no significant difference in birthweight outcomes between the two groups.

Discussion:

The study conducted at the Combined Military Hospital in Rangpur, Bangladesh, encompassing 84 participants, offers a comprehensive examination of the outcomes in pregnancies complicated by Gestational Diabetes Mellitus (GDM) and pre-existing Diabetes Mellitus (DM). The age distribution of the participants predominantly fell in the 21-30 years range, accounting for 70.24%, followed by 28.57% in the 31-40 years bracket. The mean age was 28.13 years. This age distribution is significant as it aligns with the global trend where GDM is increasingly diagnosed in younger women, possibly due to factors like obesity and lifestyle changes.[9,10] The Mean±SD age of 28.13±4.16 years falls within the range where the risk of developing GDM is heightened, underscoring the need for targeted screening and management strategies in this age group.In terms of parity, primipara (first-time mothers) constituted the largest group at 42.86%, followed by multipara with 2-3 births at 34.52%. Nulliparous women (those who have never given birth) made up 16.67%, and a smaller group of 5.95% were multipara with 4-5 births. The gestational week distribution showed that the majority were in the later stages of pregnancy, with 46.43% in the 36-38 weeks range and 30.95% in the 29-35 weeks range. This period is critical for monitoring and managing potential complications arising from GDM, such as fetal macrosomia, which can lead to delivery challenges and necessitate interventions like Cesarean Section (CS). Previous studies have indicated that primiparous women may have a higher risk of complications associated with GDM, such as preeclampsia,

compared to multiparous women.[11].The gestational week distribution, showing a majority in the later stages of pregnancy, aligns with the period where GDM-related complications are most likely to manifest. This is particularly relevant for fetal growth monitoring, as the risk of macrosomia and associated delivery complications, such as shoulder dystocia, is higher in this period.[12] The high prevalence of Cesarean Section (CS) deliveries (55.95%) in this study cohort is consistent with existing literature, which indicates an increased likelihood of CS in diabetic pregnancies due to factors like fetal macrosomia, fetal distress, and the presence of other diabetes-related complications.[13] The study's observation of no significant difference in Apgar scores or birthweight between infants born to mothers with GDM and those with pre-existing DM is a critical finding. This suggests that with appropriate management, women with GDM can achieve outcomes comparable to those with pre-existing DM. This finding is supported by recent studies indicating that effective management of GDM can mitigate adverse neonatal outcomes.[14] The high rate of normal birth weight and favorable Apgar scores further underscores the success of GDM management in the study population. In conclusion, this study provides valuable insights into the management and outcomes of pregnancies complicated by diabetes. The findings highlight the importance of effective management strategies for GDM to ensure favorable pregnancy outcomes. They also align with existing research that shows the potential for successful outcomes in pregnancies complicated by diabetes, emphasizing the need for individualized care and monitoring.

Limitations of The Study

The study was conducted in a single hospital with a small sample size. So, the results may not represent the whole community.

Conclusion:

In conclusion, this study conducted at the Combined Military Hospital in Rangpur, Bangladesh, offers significant insights into the outcomes of pregnancies complicated by diabetes mellitus, both gestational and pre-existing. The findings reveal that with appropriate management, pregnancies affected by diabetes, whether gestational or pre-existing, can result in favorable outcomes. The majority of the participants, predominantly in the 21-30 years age range, experienced successful live births with a high rate of normal birth weight and favorable Apgar scores. The high prevalence of Cesarean Section deliveries, primarily due to gestational age and GDM, underscores the need for vigilant obstetric management in diabetic pregnancies. These observations emphasize the importance of targeted screening, individualized care, and comprehensive management.

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Conflict of interest: None declared

Ethical approval: The study was approved by the Institutional Ethics Committee

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